

REMARKS

Claims 1-6 and 22-28 are currently pending in the present patent application, with claims 7-21 having been withdrawn in the previously filed Response to Restriction Requirement.

In the Office Action, the Examiner rejected claims 1-6 and 22-26 under 35 U.S.C. § 102(a) as being anticipated by applicant's admitted prior art (AAPA) disclosed in the present application. Claims 27 and 28 were rejected as being unpatentable under 35 U.S.C. § 103(a) over the AAPA.

The Examiner also objected to Figures 1-15 and requested that these figures be designated with a legend such as "Prior Art." Replacement sheets for Figures 1-15 with the requested legend were sent with the original submission of this response on August 2, 2005. In addition, Figures 14 and 15 were amended to more clearly illustrate the described embodiments of the present invention. A replacement sheet for Figure 26 was also included in the original submission of this response on August 2, 2005 to correct an erroneous designation for one of the longitudinal portions 50". None of these replacements adds new matter to the present application.

One embodiment of the present invention is illustrated in Figure 26, which shows a portion of a DMOS transistor and illustrates the alignment between a body-contact region 61 and a respective contact 38 of the transistor. The figure clearly illustrates a boundary of the body-contact region 61 is substantially the same as a boundary of the contact 38, with an opening 37c defining these boundaries. This figure neglects transversal diffusion by doping agents forming the body-contact region 61, and thus the two boundaries are said to be substantially the same. Figure 24 illustrates a square 37b that defines the boundary of both the contact 38 and the body-contact region 61, with the body contact region 61 being formed using the aperture or square 37b made for the contact.

In contrast to the described embodiment of the present invention, the AAPA as shown in Figure 15 includes a body-contact region 31 that is not aligned with the contact 38. As shown in Figure 14, a square designated 37c corresponds to an opening for the contact 38 while a rectangle encircling the center contact 37c

corresponds to the body contact region 31. Figure 11 also shows the body contact mask for forming the body contact region 31 through the rectangular opening in the middle of the mask. Accordingly, in the AAPA the boundary of the contact 38 defined by the square opening 37c and the boundary of the body contact region 31 defined by a rectangle have different shapes and are not substantially the same or coincident. The body contact region 31 is not vertically aligned with the boundary defined by the opening 37c for the contact 38. With the AAPA approach, possible misalignments between the body contact mask 30 and the contact mask 36 mean that in general the contact opening 37c is not even centered with respect to the body contact region 31. This is one of the problems addressed by embodiments of the present invention. Figure 15 depicts only the desired geometry, ignoring the unavoidable misalignment between the two masks that increases the lack of alignment between the contact 38 and contact region 31 in real structures.

Amended claim 1 recites, in part, a DMOS device including at least one body-contact region of the second conductivity type formed inside the second conductive region and extending from the surface as far as the body region. A plurality of contacts of conductive material extend in the contact openings as far as the first conductive region, the second conductive region and the body-contact region. Each body-contact region has a boundary that is substantially coincident with a boundary of a corresponding contact. As just described above for the AAPA, the body-contact region 31 and contact 38 do not have substantially coincident boundaries. The combination of elements in claim 1 is accordingly allowable.

Dependent claim 2 recites the device of claim 1 wherein the second conductive region comprises at least one first implanted region, having a third doping level lower than said second doping level, and two second implanted regions, having a fourth doping level higher than said third doping level. The first implanted region comprises a peripheral portion contiguous to the second implanted regions at least on one side facing the first conductive region and a transverse portion extending from the peripheral portion, physically separating and electrically connecting the second implanted regions. The transverse portion accommodates the body-contact region.

According to the AAPA, because of the shape of the source mask 17 and in particular the limited width of portion 17a, the LDD regions 19' are formed each by a single longitudinal portion extending below a respective spacer portion 24 as shown in the attached Figure 14. There is no transversal portion, and the second implanted region or source 27 in this embodiment is not interrupted by the first implanted portion. Because of the shape of the source mask 52 and in particular the presence of islands 53, source region 27 is not implanted below the island 53, where the transverse portions of the LDD regions 50 form. Figure 19 shows the cross-section through a transverse portion 50' and Figure 20 shows the cross-section where the longitudinal portions 50'' are present.

The combination of elements recited in amended claim 2 is therefore allowable for these additional reasons. These same comments apply with respect to claim 3 and thus dependent claim 3 is also allowable for these additional reasons.

Amended claim 22 recites a DMOS device including, in part, a plurality of contacts of conductive material, each contact having a boundary. A body-contact region in the first conductive region has a boundary that is substantially the same as the boundary of a corresponding one of the contacts. Once again, in the AAPA the body-contact region 31 simply does not have a boundary that is substantially the same as the boundary of a corresponding contact 38. Accordingly, the combination of elements recited in amended claim 22 is allowable.

All dependent claims not expressly discussed above are allowable for the same reasons as the associated independent claim and due to the additional limitations added by each of these claims.

The present patent application is in condition for allowance. Favorable consideration and a Notice of Allowance are respectfully requested. Should the Examiner have any further questions about the application, Applicant respectfully requests the Examiner to contact the undersigned attorney at (425) 455-5575 to resolve the matter. If a need for any fee in addition to that paid with this response is found, for any reason or at any point during the prosecution of this application, kindly consider this a petition therefore and charge any necessary fees to Deposit Account 07-1897.

Dated this 23rd day of August, 2005.

Respectfully submitted,

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